

L058.074



PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Flexible Web Product

We, AVERY PRODUCTS CORPORATION, a Company organised under the laws of the State of California of 415 Huntington Drive, San Marino, California, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to a new flexible web product. The new product contemplated by the invention is not a consumer product, but is designed for use by web converters and others who apply pressure-sensitive adhesive to wholly or partially finished flexible web products, and for use by manufacturers or users of flexible web products (e.g. packagers) who have not previously been practically able to provide or employ pressure-sensitive adhesives in certain applications.

It is old to apply a pressure-sensitive adhesive to a flexible web or other base by employing a transfer tape. Such transfer tape has generally consisted of a supporting and protective base or backing tape that carries a pressure-sensitive adhesive that has been previously coated on one side of the base. The side of the base or backing tape that supports the adhesive coating is itself release coated, so that when the exposed side of the pressure-sensitive adhesive is subsequently combined with face stock, the pressure-sensitive adhesive is much more strongly adhered to such face stock than to the backing tape. The backing tape may remain as a temporary protective backing for the sheeting, but may be readily stripped when the face stock is to be adhered to other articles.

It has been conventional in transfer tapes to also release coat the side of the backing tape that does not support the pressure-sensitive adhesive coating, so that the tape may be self-wound for economical storage and transport. The manufacture of such a tape therefore involves release coating the two opposite sides

of the base or backing tape. Production equipment for doing this in a single run is costlier than equipment for coating only a single side. Manufacturing cost of coating the opposite sides in two successive runs is also higher than manufacturing cost of a product that can be coated in a single run. So either way release coating the two opposite sides of the base or backing tape is costly.

In such transfer tapes that are release coated on both sides of the base or backing, the exposed release coated side of the base or backing is very slippery and creates web handling and guiding problems both in the completion of manufacture of the transfer tape itself, and in subsequent use of the transfer tape in web combining operations. Also, handling or guiding of the tape in such subsequent use must be performed in such a way that the pressure-sensitive-adhesive side of the transfer tape does not contact any rolls or other web guiding or handling members. Such contact would quickly cause the web guiding or handling members to become fouled with the tacky pressure-sensitive adhesive.

The present invention provides a new flexible web product which is not a transfer tape, at least in the usual sense of that term, but which can be used in applications where transfer tapes have previously been used, and in other applications where transfer tapes have not been tried, or have not been fully successful, because of one or more of the problems mentioned above.

The flexible web product contemplated by the present invention may be manufactured by applying successive coatings to a single side of a base or backing. The resulting web combination may be easily handled or guided, if it employs paper or other non-slippery material as a base or backing, since no release coating has been applied to the exposed face of the base or backing to make it slippery. Furthermore, when a particular application

[Price

calls for it, it is even possible to handle or guide such resulting web combination or tape by contacting the opposite face of such web combination, that is, the coated side of the combination.

According to the present invention a flexible web product comprises a base web and a coating combination on the base web, the coating combination comprising a pressure-sensitive adhesive coating on the base web and a tackless agent-activated adhesive coating on the pressure-sensitive adhesive coating, the surface of said tackless agent-activated adhesive coating remote from said pressure-sensitive adhesive coating being one of the two outermost faces of said web product, wherein the adhesion across the interface between the base web and the pressure-sensitive adhesive coating is weaker than the adhesion across the interface between the pressure-sensitive adhesive coating and the tackless agent-activated adhesive coating.

As used herein, the terms "pressure-sensitive adhesive" and "agent-activated adhesive"

mean, respectively, adhesives such that the first is self-adhesive, i.e., is tacky upon mere contact or the application of light or heavy pressure without its tackiness being essentially dependent upon the use of an activating agent such as heat, and/or the application of an activating agent other than heat, such as water or solvent, while the second becomes tacky only upon use of an activating agent such as heat, water, or a solvent and, prior to activation, is substantially non-tacky or far less tacky than the pressure-sensitive adhesive. The agent-activated adhesive is substantially tackless prior to its activation by heat and/or other agent; even if it is of the heat-activated variety, it is initially tackless at ordinary room temperature; on the other hand, pressure-sensitive adhesive is quite tacky at room temperature. These differing characteristics of the two adhesives make the adhesives readily distinguishable from each other irrespective of their particular formulations. However, by way of example only, the following may be employed:

Examples of pressure-sensitive adhesive:

EXAMPLE I

	Parts by Weight
Polyisobutylene polymer (high molecular weight)	100
Polyisobutylene (viscous liquid)	70
Hexane	100

EXAMPLE II

	Parts by Weight
Polyvinyl ethyl ether	100
Hydrogenated rosin	30
Polyethylene glycol diricinoleate	20
Hexane	100

EXAMPLE III

	Parts by Weight
Butadiene Styrene copolymer (70—30 ratio by weight)	100
Ester of hydrogenated rosin	30
Petroleum oil	50
Phenyl-alpha-Naphthylamine	2
Hexane	100

Examples of agent-activated adhesive of the heat-activated variety:

EXAMPLE I

	Parts by Weight
Gelva (R.T.M.) V-7 (Polyvinyl Acetate) (Shawinigan Resins Corp. Springfield, Mass.)	80
Santicizer (R.T.M.) 160 (Monsanto)	20
Hoechst (R.T.M.) Wax W (Farbwerke Hochstg, Frankfurt)	20
Acetone	500

EXAMPLE II

	Parts by Weight
Butvar (R.T.M.) B-76 (Polyvinyl Butyral) (Shawinigan)	60
Santicizer (R.T.M.) 141 (Monsanto)	10
Resin 861 Hercules (R.T.M.) a heat treated partly isomerised wood rosin	100
Armid (R.T.M.) HT (Armour Chemical Division, Armour & Co.)	2
Castorwax (Baker Castor Oil Co., New York),	100
Ethanol	600
Toluene	400

EXAMPLE III

	Parts by Weight
Nitrocellulose (1/2 sec. SS)	56
Dibutyl phthalate	13
Dicyclohexyl phthalate	20
Dammar Wax (O. G. Innes Corp., New York New York)	8
Paraffin Wax	3
Ethanol	50
Ethyl Acetate	104
Toluene	50

Examples of agent-activated adhesives of the solvent-activated variety:

EXAMPLE I

	Parts by Weight
Hycar (R.T.M.) 1432 (B. F. Goodrich)	100
Phenolic Resin*	50
Methyl Ethyl Ketone	500

* Schenectady SP-12 or similar type resin.

EXAMPLE II

	Parts by Weight
Hycar (R.T.M.) 1072 (B. F. Goodrich)	6.0
Phenolic Resin	24.0
Coumarone-Indene Resin	1.5
MEK	68.5

EXAMPLE III

	Parts by weight
Neoprene W	100
Antioxidant	2
Silene EF	10
XLC Magnesium Oxide	4
Zinc Oxide	5
Heat-reactive phenolic	20
Toluene	400

An example of an agent-activated adhesive of the water-activated (water-reactivated) variety:

	Parts by Weight
Gelva S—55 (Shawinigan Resins Corp.)	50
Gelvitol (R.T.M.) 20—30	15
Water	35

5 In the accompanying drawings, Figure 1 schematically shows a flexible web product embodying the invention. Figure 2 shows the product applied to face stock or other web material. The web combination illustrated in Figure 1 includes a base web 10 of paper or film material or the like. Typically, this may have a thickness of say from 1 to 5 mils.

10 A pressure-sensitive adhesive coating 11 is applied on the base web and is dried and overcoated with a tackless agent-activated adhesive coating 12. The coatings 11 and 12 may be successively applied to the top side of the base web 10. Typical dry thickness of the coating 11 may be about 1 mil. Dry thickness of the coating 12 may be about 1/2 mil.

20 The adhesion across the interface between the base web 10 and the pressure-sensitive adhesive coating 11 is weaker than the adhesion across the interface for the pressure-sensi-

tive adhesive 11 and the agent-activated adhesive coating 12, and should also be weaker than the cohesion of the pressure-sensitive adhesive 11.

25 These relationships may be accomplished by the formulations given above and use of an appropriate release coating if necessary on the top or inner surface of the base web 10 prior to coating with the pressure-sensitive adhesive 11. It should be understood that adhesives other than those specifically mentioned can be employed to give the relationships called for. The pressure-sensitive adhesives may comprise 30 in general materials prepared from butadiene-styrene copolymers or from natural rubber with varying proportions of natural or synthetic resins, mineral fillers, plasticizers, antioxidants and other additives, or vinyl polymers or polymers of methacrylic acid esters 35 or other acrylic acid esters may be used. The 40

polymer or rubber influences parting properties and imparts cohesiveness and strength to the adhesive. The adhesiveness may be determined by proportioning of tackifiers known to possess fairly specific wetting power, or particular polymers or resins may be selected; or the resin proportions may be varied. Dehydrogenated and hydrogenated rosin, polyvinyl ethers, pine tar and methyl esters of hydrogenated rosin, terpene polymers, and hydrogenated coumarone-indene resins may be used. Generally, the higher the proportion of tackifier to polymer, the higher the adherence. For all presently considered fibrous backing webs such as paper, and for many non-fibrous backing webs, the pressure-sensitive adhesives given above will release from the agent-activated adhesives given above more readily than they will release from the backing web, unless the adhesion across the interface between the pressure-sensitive adhesive and the backing web is reduced, as by application of a release coating, or by other measures, such as providing the backing in creped form. However application of a release coating on the base web 10, or other measures such as provision of a creped backing, may be eliminated if the specific adhesion of the pressure-sensitive adhesive to the particular base web (say a slippery film material) is less than the specific adhesion of the pressure-sensitive material to the agent-activated adhesive. If a release coating is employed, it may be any suitable commercially available release coating material, such as Dow-Corning "Syl-off 22." These coatings may be solvent coated and heat cured as described in the foregoing patent or as described in sales literature in the case of commercially available coatings. If a release coating is employed, it is generally thin in dimension as compared with the other coatings. A release coating on the upper face of the base web 10 might be say 1/4 mil in thickness.

The application of coatings such as the pressure-sensitive adhesive 11 may be accomplished through the use of suitable solvents as is well known in the art. The coating solvent for the pressure-sensitive adhesive 11 may then be removed with heat and the coating 11 overcoated with the agent-activated adhesive 12. The coating solvent for the latter coating operation may then be removed with heat. In the case of a heat-activated adhesive, either solvent coating or hot melt coating may be employed.

The product shown in Figure 1 may be self-wound for storage and transport. The product shown in Figure 1 can also be cut into sheets which may be stacked for storage and transport, although generally self-wound rolls are more economical to store and to ship.

In use, the product shown in Figure 1 is combined with a web 13 which constitutes a label face web or other web to be gummed. This may be accomplished simply by provid-

ing for the webs 10 and 12 to be pressed or positioned together, while the adhesive 12 is in an agent-activated state. In other words, the adhesive 12 is in an agent-activated state as or after the webs 10 and 12 are brought together, and when the adhesive 12 in its activated state is in contact with the web 13, it bonds to the web 13 and therefore effects a transfer to the web 13 of the pressure-sensitive adhesive 11, so that the pressure-sensitive adhesive 11 becomes more strongly adhered to the web 13 than to its original support (base web 10). The base web 10 may remain with the combination for the time being to function as a protective cover rather than a base, or it may be stripped as part of, or following, the transfer operation.

If the agent-activated adhesive is to be a heat-activated adhesive, it should be mentioned that some heat-activated adhesives remain tacky for a time following initial heat activation and these may be employed as the adhesive 12 and may be activated prior to application of the Figure 1 combination to the web 13, or the adhesive 12 may comprise any suitable heat-activated adhesive that is activated just prior to such application, so long as it remains sufficiently tacky to effect the transfer at actual application.

It is to be noted that the coating steps performed in the manufacture of the product shown in Figure 1, as described above, may all be performed on a single side of the base web 10 in a single run, such run providing, of course, for suitable drying times and temperatures between successive coating steps. The omission of a release coating on the opposite side of the base web becomes practical because the tackless characteristic of the adhesive layer 12 allows the web product shown in Figure 1 to be self-wound without blocking or sticking between the layer 12 and the base 10 of an adjacent turn. It is even possible where necessary in some applications to handle or guide the product shown in Figure 1 by contacting the exposed face of the agent-activated adhesive 12.

WHAT WE CLAIM IS:—

1. A flexible web product comprising a base web and a coating combination on the base web, the coating combination comprising a pressure-sensitive adhesive coating on the base web and a tackless agent-activated adhesive coating on the pressure-sensitive adhesive coating, the surface of said tackless agent-activated adhesive coating remote from said pressure-sensitive adhesive coating being one of the two outermost faces of said web product, wherein the adhesion across the interface between the base web and the pressure-sensitive adhesive coating is weaker than the adhesion across the interface between the pressure-sensitive adhesive coating and the tackless agent-activated adhesive coating.

2. A product according to claim 1, including a release coating at the interface, between the

base web and the pressure-sensitive adhesive coating.

- 5 3. A product according to claim 1, substantially as described and as illustrated in the accompanying drawings.

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COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of
the Original on a reduced scale*

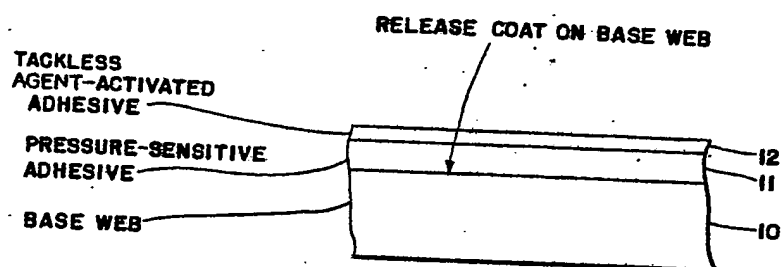


Fig. 1

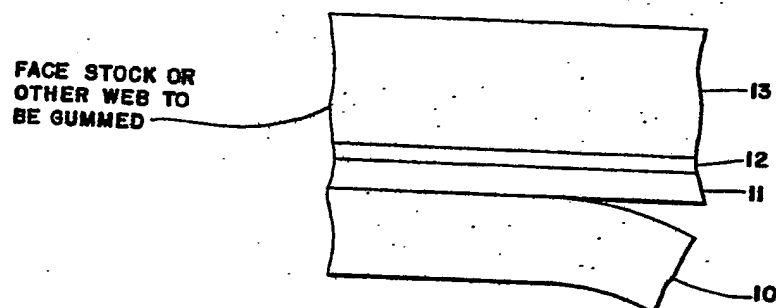


Fig. 2